Business and Functional Requirements – Warranty Analytics

Input Requirements

Document ID	**C1.1 – Business and Functional Requirements**

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Business Requirements

The goal of this data analytics application is to establish easy access to warranty and diagnostic data and provide the tools to generate deep insights.
Warranty data consists of different warranty claims presented from repair shops to the customer.

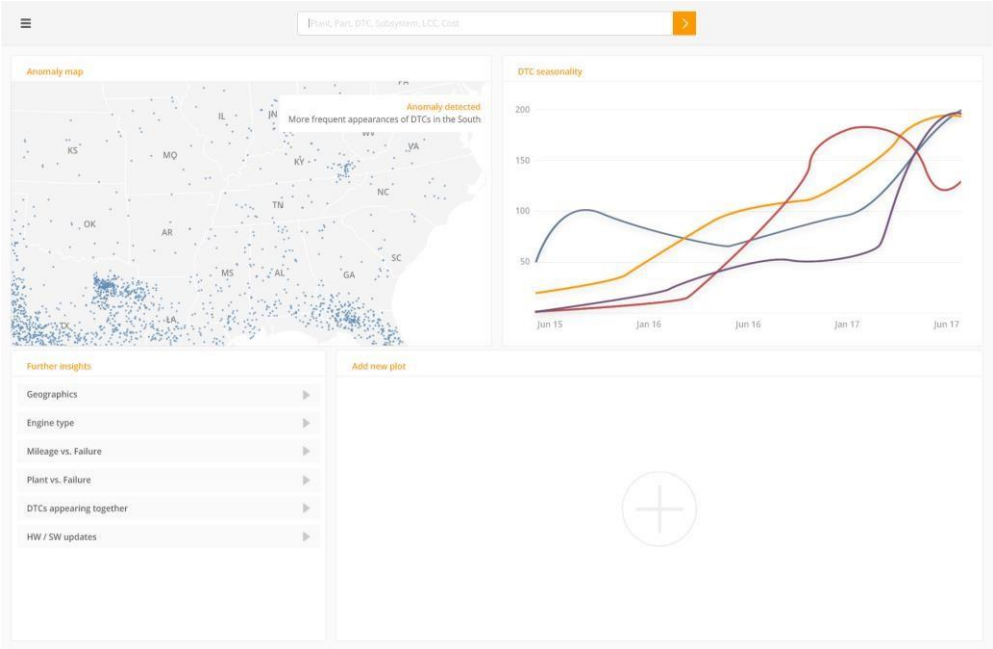
Diagnostic data are error codes called *Diagnostic Trouble Codes* which are sent from the car to the OEM.
The web application should feature modern functionality like search recommendations based on input

Simple Access

The tool is meant to give access to the information of multiple databases at once providing one interface to all of them and allowing making connections between the databases.
One application of this interface is the so called *Vehicle History* which should visualize the historic development of DTCs and warranty claims for one vehicle.
In addition to information on the vehicle, the currently selected repair event and the selected DTC code is to be presented. Some global overview relating selected parts and DTCs not only for one vehicle but for all cases is also necessary.

Global View

The global view offers a more dynamic view of all the datasets involved. It should be possible to dynamically create new visualizations of the data and in the creation process select different parameters for these charts like time frame, data source, thresholds.
Furthermore in the future it should offer some anomaly detection, highlighting data which is significantly different from the rest.
The main goal of this global view is to create an opportunity for data exploration using well established methods.



Functional Requirements

Sitemap

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- Global Warranty Analysis
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Visualizations

Accessibility

- Each chart downloadable as svg and png

Single Case Analysis

(see available charts in the app)

Additional Features

- For the bar charts an interface to select the timeframe they represent
- Add hover effects to part numbers in the bar plots showing more information like the part name and the producer.
- Add hover information to the DTCs (from xref database)
- Add connection to Global view making all the properties like VIN, Engine, Part Numbers into links linking to respective Global interfaces

Bugs

- The scale of the bar charts is not adapted when the data changes

Global View

Add plots by clicking on the plus sign (see screenshot).

Standard Plots

- Focus on counts of DTCs, warranty claims.
- Bar charts, line charts, histogram, density plots with respect to time (month, year, quarter), mileage, time of service.
- Sliders for time/mileage/time of service.
- Option to add multiple parts, DTCs.

Plot 1 Warranty

From ewt database

- Count of warranty cases over time, Claims per 1000 cars, Total costs, costs per vehicle
- Can be filtered by all the columns in *ewt*, for now only filtering for one specific item (e.g. Model asdjfl), filters should work like search bars, you can start typing and autocompletion starts
- Up to 3 filters at the same time
- *Additional:* Possibility to add multiple counts in the plot (e.g. 2 line plots, two different type of bars, cf. the picture of the DTC seasonality plot) to compare
- User can specify the unit of the time axis (day, month, quarter) for the bar plot
- *Additional:* Possibility to choose another x axis (mileage, time/months of service)
- Add part name information, information *CONTI_PART*, pras information (percentage of parts that are TNF, ADC … and so on in ROOTCAUSE category)

Plot 2 SQDF

From sqdf database

- Count of DTCs over time, Claims per 1000 cars
- Can be filtered by all the columns in *ewt*, for now only filtering for one specific item (e.g. Model asdjfl), filters should work like search bars, you can start typing and autocompletion starts
- Up to 3 filters at the same time
- *Additional:* Possibility to add multiple counts in the plot (e.g. 2 line plots, two different type of bars, cf. the picture of the DTC seasonality plot) to compare
- User can specify the unit of the time axis (day, month, quarter) for the bar plot
- *Additional:* Possibility to choose another x axis (mileage, time/months of service)

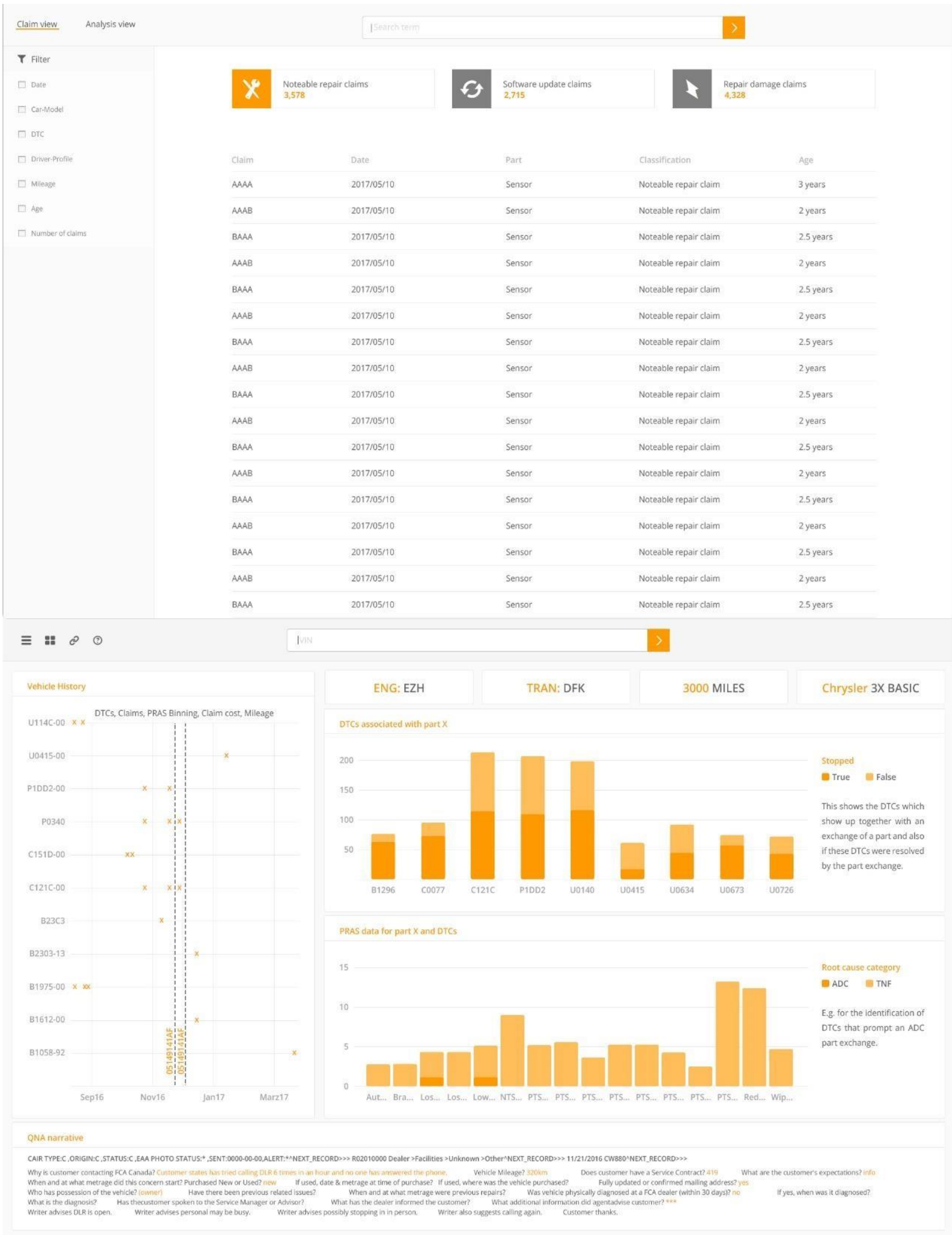
List or car model with red blinking parts

- Deterioration from last year (Number of Claims, Claims per 1000 cars, Total costs, costs per vehicle)
- By worst for current year (Number of Claims, Claims per 1000 cars, Total costs, costs per vehicle)
- Filters by Conti Overall, Business Unit, Product Family (LCC), Plant (SMLC), or base part number.
  (For Business Unit and overall filtering we still need additional data)
- Filters by time (e.g. show only the events for the last 5 months) Plot 3
- List of the most frequent claims for *CONTI_PART*s base on the counts of the last month, if the number of claims is higher than in the previous year mark it red (relevant are EWT, xref here)
- Clicking on a claims opens the respective Plot 1

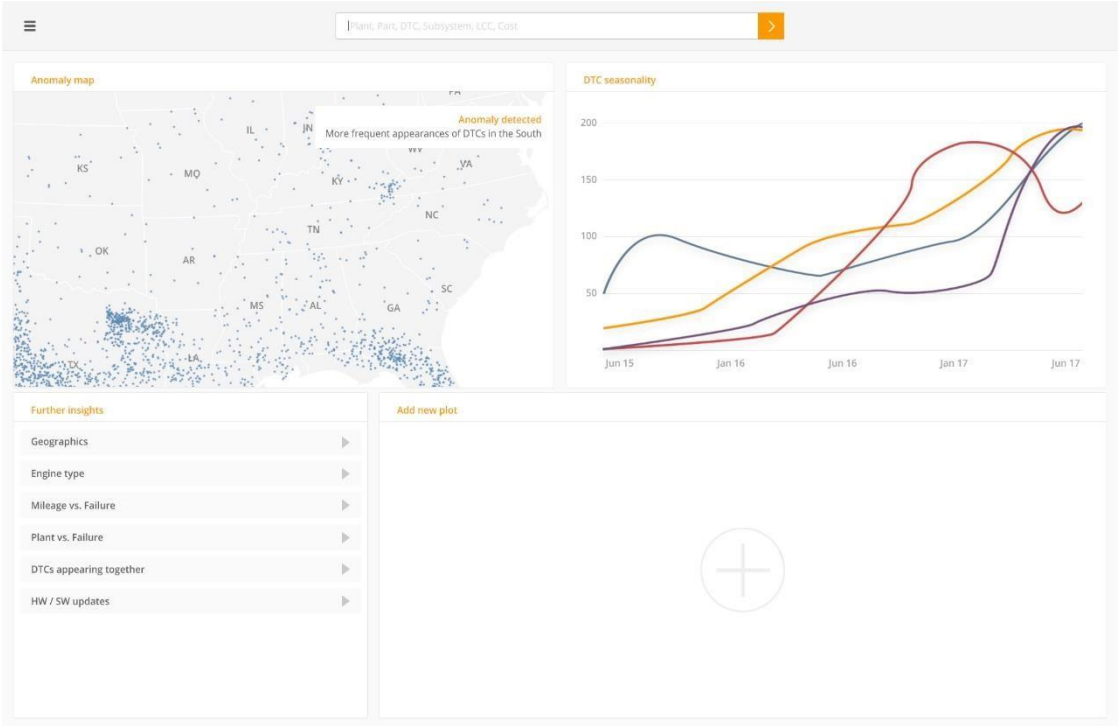
List of current issues coming up

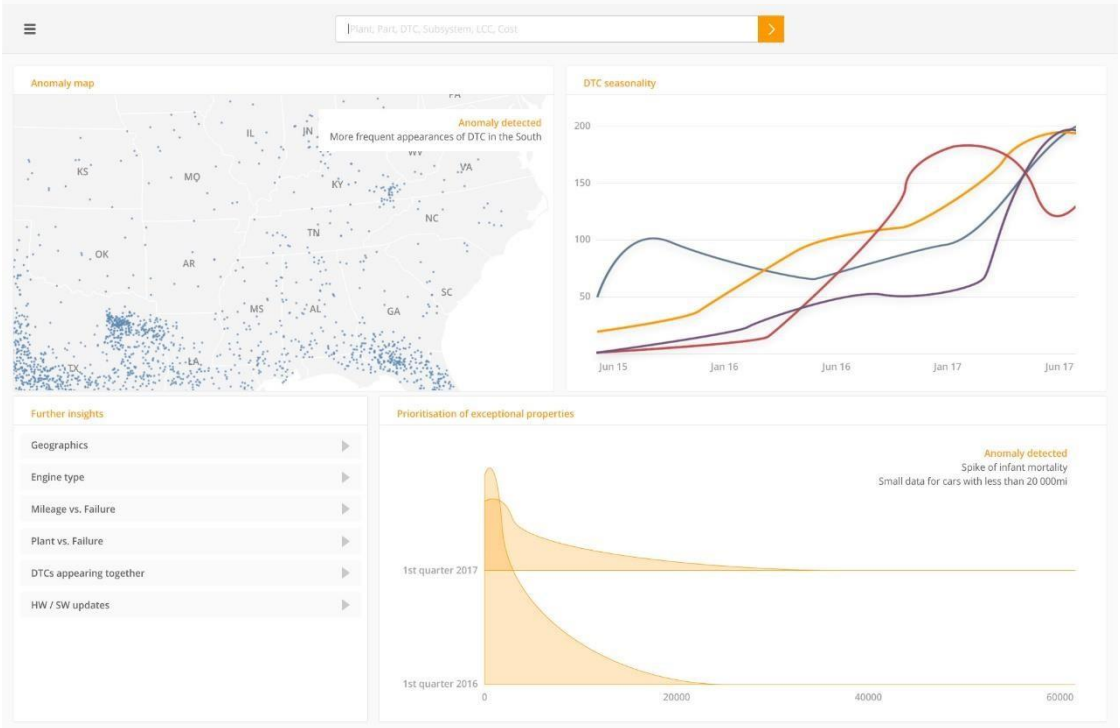
- SMLC LCC top 100

Design



Claim view
Analysis view
Search term
Filter
Date
Car-Model
DTC
Driver-Profile
Mileage
Age
Number of claims
Noteable repair claims 3,578
Software update claims 2,715
Repair damage claims 4,328
Claim
Date
Part
Classification
Age
AAAA
2017/05/10
Sensor
Noteable repair claim
3 years
VIN
Vehicle History
DTCs, Claims, PRAS Binning, Claim cost, Mileage
ENG: EZH
TRAN: DFK
3000 MILES
Chrysler 3X BASIC
DTCs associated with part X
Stopped
True
False
This shows the DTCs which show up together with an exchange of a part and also if these DTCs were resolved by the part exchange.
PRAS data for part X and DTCs
Root cause category
ADC
TNF
E.g. for the identification of DTCs that prompt an ADC part exchange.
QNA narrative





Possible Filters and Features

(to apply where reasonable)

- Mileage
- Time of service
- Region
- Engine
- Transmission

- Plant
- Build month
- Warranty cots
- Body model
- DTCs
- Platform
- Repair month
- Repair region

After enrichment

- Driver profile (regional/non-regional)
- Highway/Urban setting
- Rain/No rain
- Temperature

Normalize Claims

Other

Add Continental Contact information to parts, highlight conti parts